Kinetic analysis on the effects of lead (Pb) and silver (Ag) on waste canola oil (WCO) biodegradation by selected Antarctic microbial consortium

ABSTRACT

Canola oil is used in most of Antarctic research station base and the possibility of discharging the waste canola oil (WCO) through the pipe in the kitchen is high, which leads to environmental pollution. Consortium bacteria form the Antarctic was isolated in degrading the WCO and tested regarding the degradation of oil with the presence of heavy metals. In this study, lead (Pb) and silver (Ag) were used to determine the behaviour of the bacteria consortium to degrade the WCO. The presence of lead allowed the degradation of oil to increased 48% to 56% while the availability of silver prevented the bacterial to grow and degrade the contaminants. Many types of data are best analysed by the fitting curve. The bacterial growth was fitted using both and linear and nonlinear regression curve where the exponential growth equation was used in a nonlinear curve. Bacterial growth with lead shown to be properly fit towards the curve with a high value of R2 and low-value RMSE. In addition, there was no significant difference between linear and exponential regression curves for both conditions of the bacteria with heavy metals, lead and silver.

Keyword: Antractica; Canola oil; Degradation; Heavy metal; Kinetic